

In accordance with a third object of the present invention, this object is achieved by a method for decoding a bit stream representing a coded audio signal, where the coded bit stream contains code words of different lengths from a code table and has a raster with equidistant raster points, where the code words include priority code words, which represent particular spectral values of a block of spectral values which are psychoacoustically important compared to other spectral values, where the block of spectral values represents a spectrum of a block of temporal samples of the audio signal, and where priority code words are aligned with raster points so that the start of a priority code word representing a spectral value of the block of spectral values coincides with one raster point and the start of another priority code word representing another spectral value of the block of spectral values coincides with another raster point, comprising the following steps: detecting the distance between two adjacent raster points; re-sorting the priority code words, which are aligned with the raster points, in the coded bit stream in such a way as to obtain a linear arrangement of the same with frequency, the start of a priority code word coinciding with a raster point; decoding the priority code words with an associated code table to obtain decoded spectral values; and transforming the decoded spectral values back into the time domain to obtain a decoded audio signal.

In accordance with a fourth object of the present invention,  
this object is achieved by a device for decoding a bit stream

representing a coded audio signal, where the coded bit stream contains code words of different lengths from a code table and has a raster with equidistant raster points, where the code words include priority code words, which represent particular spectral values of a block of spectral values which are psychoacoustically important compared to other spectral values, where the block of spectral values represents a spectrum of a block of temporal samples of the audio signal and where priority code words are aligned with raster points so that the start of a priority code word representing the spectral value of the block of spectral values coincides with one raster point and the start of another priority code word representing another spectral value of the block of spectral values coincides with another raster point, comprising: a unit for detecting the distance between two adjacent raster points; a unit for resorting the priority code words, which are aligned with the raster points, in the coded bit stream in such a way as to obtain a linear arrangement of the same with frequency, the start of a priority code word coinciding with a raster point; a unit for decoding the priority code words with an associated code table to obtain decoded spectral values; and a unit for transforming the decoded spectral values back into the time domain to obtain a decoded audio signal.

The present invention is based on the finding that the raster already proposed must be fashioned or occupied in a way that permits efficient coding/decoding as well as error-tolerant coding/decoding. Of prime importance here is the fact that the code words, which are obtained by an entropy coding in the form of a Huffman coding, are inherently of different lengths since the greatest coding gain results when the most frequent value to be coded has a code word of the shortest possible length assigned to it. On the other hand a value to be coded which occurs relatively infrequently, even though it has a relatively long code word assigned to it, results in an opti-

mal amount of data viewed statistically. Code words obtained by a Huffman coding thus have different lengths per se.

According to a first aspect of the present invention so-called priority code words are placed at the raster points so that the start of the priority code words can be identified without fail by a decoder via the raster even if there is an error in the bit stream. Priority code words are code words which are psychoacoustically important. What this means is that the spectral values which are coded by so-called priority code words contribute substantially to the auditory sensation of a decoded audio signal. If the audio signal has a high speech content, the priority code words could be those code words which represent lower spectral values, since in this case the important spectral information is located in the low region of the spectrum. If an audio signal has a group of tones in the middle region of the spectrum the priority code words could be those code words which are assigned to the spectral values in the corresponding middle section of the frequency range, since these are then the psychoacoustically important spectral values. Psychoacoustically important spectral values might also be spectral values whose magnitude, i.e. signal energy, is large compared with that of other spectral values in the spectrum. Code words of less psychoacoustic importance, which are also called non-priority code words, on the other hand, fill up the raster. They are not therefore aligned with the raster points but are "slotted into" the remaining free spaces once the priority code words have been positioned on the raster points.

According to the first aspect of the present invention, therefore, the priority code words, which are assigned to spectral values which are psychoacoustically important, are so arranged in a raster that the start of the priority code words coincides with the raster points.